

## BED SURFACE WITH IMPROVED STRUCTURE

The present invention refers to a bed plane with improved structure.

5 The rhythm of our way of life, working whilst seated and the increasingly frequent lack of physical exercise lead us increasingly towards a new concept of comfort, determined by new habits and requirements.

Considering this, the bed, the place where we spend  
10 around one third of our lives, occupies a particularly important space and constitutes the object of modern health research.

The upright position that sets apart the human race has ensured that, during the course of evolution, the  
15 spinal column takes up a particular S-configuration; such a configuration, optimal for movement in upright position, is nevertheless particularly vulnerable to painful pathologies, such as dorsalgia, back ache, lumbar and cervical arthrosis, slipped discs, etc.

20 To avoid encouraging such pathologies it is essential to have bed planes that allow the spinal column to keep the same position when lying down as when it is in upright position.

Indeed, an incorrect rest position prevents total  
25 muscle relaxation delaying or preventing the deepest phases of sleep (REM) from being reached, which are

necessary for regenerating our psych-physical balance and, therefore, our health.

Variable and individual factors, such as body shape and the positions assumed during rest, are the main  
5 elements to be considered in realising the optimal bed system, which evolves the quality of sleep and, consequently, the quality of life.

The purpose of the present invention is, therefore, that of realising a bed plane with improved structure,  
10 which allows orthopaedically correct support of the spinal column to be obtained, with the further possibility of obtaining an active reaction of the bed plane to the anatomy of the body lying down.

Another purpose of the present invention is that of  
15 realising a bed plane with improved structure, in which aesthetic considerations are integrated with a system ideal for sleep, capable of ensuring total and physiologically healthy rest in all aspects.

Another purpose of the present invention is that of  
20 indicating a bed plane with improved structure, which allows personalised resting solutions to be obtained, capable of individually solving the problems connected with getting a good nights sleep.

A further purpose of the present invention is that of  
25 indicating a bed plane with improved structure, which, in relation to the different areas of pressure that our

body exerts on the mattress according to purely individual variables, always ensures a correct posture, designing tailored sleep for each user.

The last but not least purpose of the present invention  
5 is that of realising a bed plane with improved structure that is easy and cost-effective to make, without using complex technologies or expensive components.

These and other purposes are accomplished, within the  
10 scope of the present invention, by realising a bed plane with improved structure, according to claim 1, to which we refer for the sake of brevity.

Advantageously, the bed plane according to the present invention ensures quality of rest for all body shapes  
15 (tall, short, obese, thin, etc.), weights and individual needs, based upon the different positions assumed during sleep (mainly prone, on one's back and on one's side), which determine infinite distributions of the weight of the body lying down.

20 The support structure of the bed plane, indeed, allows the transversal slats to actively react to the weight exerted by the different anatomical areas of the body lying down, with an upward thrust of equal intensity, equally distributed over the entire length of the bed  
25 plane, and thus ensures total comfort for any person, since it constitutes an orthopaedically correct support

for the spinal column, ensuring the relaxation of the muscular system, the maintenance of a suitable body temperature and the hygienic conditions that protect against mites, bacteria, mould and dust.

5 The bed plane can be available both in fixed and articulated form, adjustable manually or else with a motor (even with a remote control), so as to constitute the ideal solution for sleeping, but also for relaxing and reading, thanks to the possibility of adjusting the  
10 inclination of the plane according to one's own needs.

The flexible slats respond elastically to the stresses of the body lying down, yielding only where necessary, preventing sinking of the body and thus allowing the spinal column to assume a physiologically correct  
15 position, the muscle system to relax and the mattress to transpire to allow sleep always in perfect hygiene conditions and in an ideal microclimate.

Basically, the bed plane adjusts on the body, independently of the weight and the positions assumed  
20 in sleep, giving an intense feeling of well-being, similar to the total relaxation obtained when floating on water; moreover, in the case in which the slats are not contained in a perimetric frame, they are equally flexible both at the centre and at the ends,  
25 guaranteeing substantial comfort for the user.

The characteristics and advantages of a support

structure for bed planes according to the present invention shall become clearer from the following description, given as an example and not limiting purposes, referring to the attached schematic drawings,  
5 in which:

- figure 1 is a schematic side view of a portion of bed plane with improved structure, according to the invention, in rest conditions;
- figure 2 is a schematic side view of a portion of bed  
10 plane with improved structure, according to the invention, in stress conditions of the bed plane following a body lying down;
- figure 3 is a schematic side view of a portion of bed  
15 plane with improved structure, according to the present invention, in rest conditions, in which the operation of an articulated part of the plane is illustrated.

The structure of the bed plane, object of the present invention, comprises a frame, generically indicated  
20 with 10 in the figures and consisting of a central bearing body, from which a plurality of stems or pistons 11 project, at the top end of which the slats are connected, through balancing joints, said slats being arranged transversally to the plane, which  
25 usually constitute the support for the mattress.

Alternatively, the top ends of the stems 11 are

connected to a support beam, in turn connected, again through balancing joints, to a pair of flexible slats. Each stem 11 has a vertical excursion, which allows the bed plane to adapt to the anatomy of the body, receiving the heaviest and bulkiest zones, such as the shoulders and pelvis and energetically propping up those that require greater support, such as the lumbar zone, independently of the weight and configuration of the person who lies down there; this happens by exploiting the principle of equalisation of pressures, so that the lowering of one or more slats or portions thereof corresponds to the raising of other slats of the plane.

Thus, bed plane and mattress actively interact with each other, adapting to each other and ensuring the full achievement of the predetermined purposes.

As already stated earlier, the bed plane of the invention can foresee the use of two different types of frame 10: a perimetric frame 10, in which the slats are contained inside the frame 10 itself, or else a frame 10 constructed in an underlying position, in which the slats define the perimeter of the bed plane and the aforementioned frame 10 is smaller in size than the slats.

With reference to the aforementioned figures, it should be noted how each stem or piston 11 is associated with

a respective spring (or other elastic and yielding element) 12, arranged between the top end 13 of the frame 10 and a small support block 14 of a respective pulley or sliding guide 15 for the transmission of  
5 motion.

Each pulley or sliding guide 15 is used to transmit rotary motion by means of flexible members, generically indicated with 16 in the figures, such as belts, cords, chains or cables, fixed to the frame 10.

10 Further pulleys or sliding guides for the transmission of motion are indicated with 17, each of which is fixed to the top end 13 of the frame 10 and arranged, at a predetermined distance, between one stem 11 and the next.

15 It should be specified that the stems or pistons 11 can be connected together in one, two or more rows, arranged laterally or else centrally to the frame 10 of the bed plane, whereas the slats are aligned and are slidably fixed to the ends of the bed plane, through  
20 *per se* known devices.

Moreover, the stems 11 can be arranged exclusively in one portion of the frame 10, for example in a central portion of the bed plane, corresponding to a region of the mattress that supports the spinal column; where, in  
25 prone position, on one's back or on one's side, the parts of the body between the shoulders and the pelvis

are usually rested.

From a comparison between figures 1 and 2 it is clear that, by exploiting the well known principles of communicating vessels and of equalisation of pressures, 5 the stems 11 react to the pressures exerted by the body lying down by compensating for the sinking of the bed plane, created by the heaviest parts of the body, with an upward thrust supporting the lighter parts.

Indeed, by making a certain number of stems 11 10 corresponding to a portion of the bed plane go back in, an outward thrust of the other stems 11 will necessarily be created, thanks to the transmission of motion determined by the belt 16 and by the pulleys or sliding guides 15 and 17 and thanks to the compression 15 motion of the springs 12 of the stems 11 that come out from the frame 10.

The same thing happens, in the same way and in any form of combination, making the stems 11 that were previously raised go back in, thanks to the stretching 20 motion of the springs 12, so as to obtain, correspondingly, the outward movement of respective other stems 11 in the other zones of the bed plane.

This allows absolute adaptability to the anatomy and to the configuration of the spinal column, since the 25 structure allows the heaviest and bulkiest parts, such as the shoulders and the pelvis, to be received, and



allows the spine to maintain its most natural position also when lying down, independently of the weight of the body lying upon it and the rest position; all of this is obtained, moreover, through a mechanical system  
5 that is extremely simple and substantially cost-effective, as well as safe, practical and reliable.

Figure 3 attached to the present description illustrates the same adjustment mechanism, described previously, which is applied to a bed plane with  
10 articulated portions 10A, 10B.

From the description that has been made the characteristics of the bed plane with improved structure, object of the present invention, are clear, just as the advantages are also clear.

15 In particular, they are represented by the following aspects:

- "active" support for the spinal column;
- suitable comfort for the user;
- good transpiration;
- 20 - substantial lightness of the entire structure;
- limited costs, in relation to the advantages obtained.

Finally, it is clear that numerous other variants can be brought to the bed plane with improved structure in  
25 question, without for this reason departing from the novelty principles inherent to the inventive idea, just

as it is clear that, in the practical embodiment of the invention, the materials, the shapes and the sizes of the illustrated details can be whatever according to requirements and they can be replaced with others that  
5 are technically equivalent.